Space Weather Forecast

Issued on Tuesday, 21 May 2024 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated Moderate-class flares throughout. A reducing chance of G1-G2 (Minor/Moderate) Storm conditions early Day 1 (21 May).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with the largest event a Common-class flare from a sunspot region in the southwest. There are currently eight sunspot regions on the visible disc. The largest region remains in the southeast, which comprises of a number of large, mature spots, with recent consolidation of some of the smaller spots. A sunspot region in the southwest is the next largest, which has shown some recent growth in its trailing portion. The other sunspot regions are generally smaller, simpler and generally stable.

A large filament lift-off (arc of plasma) from the southern hemisphere that began around 18/2200UTC has been modelled as missing below Earth' orbit. Another and more notable full halo CME (Coronal Mass Ejection) was observed leaving the Sun early on 20 May but further analysis has revealed that it is a far sided event, with no impact at Earth. Otherwise, no Earth-directed CMEs were observed in the past 24 hours in coronagraph imagery.

Solar Wind / Geomagnetic Activity: Solar winds have been on a steady decline, generally towards background levels, with speeds ranging between 330-430km/s. The Interplanetary Magnetic Field was weak to moderate. The north-south component was also weak and mostly positive (northward). Geomagnetic activity was at mostly Quiet to Unsettled (Kp0-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained below the S1/Minor Radiation Storm levels and are now at normal background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with a chance of isolated Moderate-class flares and a very slight chance of isolated Strong flares. The moderately sized sunspot region in the southeast disc is most likely to be the source of significant flare activity.

Solar Wind / Geomagnetic Activity: There is the chance of a glancing blow from a CME at Earth early day 1 (21 May), resulting from the Moderate-class flare that occurred late on 17 May. In the meantime, solar winds are forecast to remain at or near background speeds, with no significant coronal hole enhancements expected.

A possible glancing blow from a CME (which left the Sun on 17 May) could arrive at Earth early Day 1 (21 May) with a reducing chance of Active to G1-G2/Minor-Moderate (Kp5-6) intervals. Activity should then subside towards Quiet to Unsettled levels by Day 2 (22 May).

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Aurora Forecast: One potential enhancement to the auroral oval is likely overnight (or early 21 May) due to a possible glancing blow from a CME, although confidence is low. Should the CME be detected at Earth, aurora may become visible (where skies are clear) across parts of Scotland and Northern Ireland. The chance of enhanced aurora activity is expected to decline again on subsequent nights.

Energetic Particles / Solar Radiation: Solar radiation is below the S1/Minor Storm threshold, on a slightly declining trend, but remains just above normal background levels following flare activity from the past week. There is a persistent slight chance of further enhancements should any large flares occur.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	1	1	1
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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